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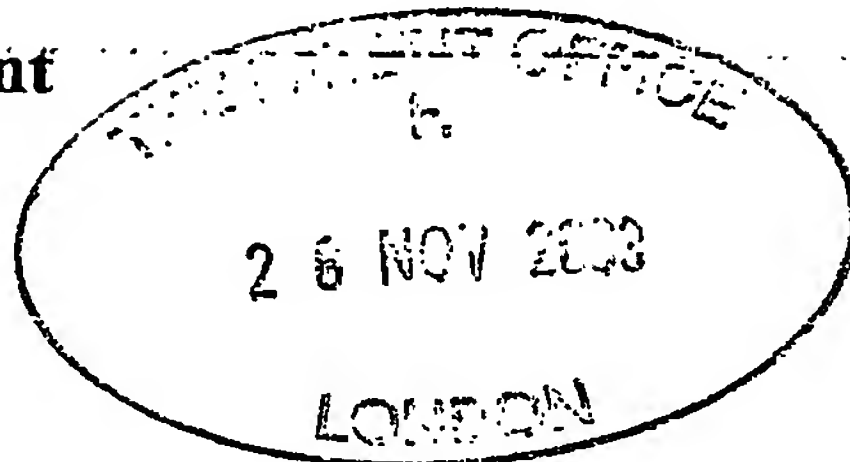
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P01/7700 0.00-0327522.9

Patents ADP number

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

8373417002

4. Title of the invention Packaging Device and container for sheet objects

5. Name of your agent VENNER, SHIPLEY & CO

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Matthew Read
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Packaging Device and container for sheet objects

Description

This invention relates to a packaging device and a container for sheet objects
 5 that have an attributable monetary value, for example paper money such as banknotes or like promissory notes.

Hitherto, banknotes have been counted in note counting machines and wrapped in stacks with paper bands. Also, vacuum packing machines have been used to
 10 pack stacks of banknotes in airtight bags that are evacuated of air and sealed. Banknotes packaged in this way can be transported readily without the risk of the individual stacks being pilfered. However vacuum packing machines are expensive and normally used only for processing large volumes of banknotes.

15 For smaller volume applications, for example in retail operations, devices such as our WACS 5 (World Acceptor Cassette System) note bill and bar coded ticket/coupon acceptor may be used, which has a cassette stacking system. The cassette comprises a metal box that receives validated bank notes or the like from a note acceptor. The cassette can store of the order of 500 street-grade
 20 banknotes. The cassette may be removed by an operator and taken to a secure location where it is unloaded, for onward transmission of the banknotes e.g. to a bank. A problem with the cassette system is that it can be opened during transport and runs the risk of pilfering. Furthermore, the cassette provides no ready indication that it has been opened and that pilfering may have occurred.

25 According to the invention from one aspect there is provided a packaging device for packaging a stack of sheet objects that have an attributable monetary value in a container, comprising: an output port for supplying sheet objects to be stacked in the container, a docking mechanism to receive the container, so that an
 30 opening in the container can receive the sheet objects from the output port, a drive mechanism for driving the sheet objects to the output opening, and for supplying the sheet objects through the opening into the container to be stacked

therein, and a sealing device to seal a closure member onto the container opening whilst held by the docking mechanism so as to seal the stacked sheet objects within the container such that the sealed container cannot be opened without rendering it subsequently unusable for packaging sheet objects in the packaging
5 device.

In another aspect, the invention provides a container for packaging sheet objects with an attributable monetary value, comprising an opening to receive the sheet objects, a base, sidewalls extending towards the opening from the base, support
10 rails coupled to the side walls on opposite sides of the opening, past which in use the sheet objects resiliently deform when placed in the container in a stacked configuration, and a spring in the base operable to urge stacked sheet objects in the container against the support rails, the container being configured to receive a closure member sealed thereto over the opening so that the container cannot
15 be reused for stacking sheet objects once opened.

Thus by means of the invention, sheet objects such as banknotes can be stacked in the container which is provided with a sealed closure member so that once opened, the container cannot be reused for packing sheet objects. The container
20 thus provides a clear indication as to whether the contents have been tampered with. Thus, the container may be disposable and need not be returned for re-use as with a conventional cassette, which is a relatively expensive item.

Furthermore the packaging device according to the invention may include a
25 printer to print data relating to sheet objects supplied into the container and the printing may be performed onto a side of the closure member but after sealing is on the inside of the container. This provides a tamperproof configuration in which data corresponding to the number and denomination of sheet objects can be securely associated with the contents of the container.

30

The invention also includes an improved device for removing sheet objects from the container, which includes a support for the container around the periphery of its

opening, a ram to apply a force to the base to drive it towards the opening and to collapse the side walls and cause the sheet objects to burst open the closure member so that the objects move out of the container through the opening.

5 In order that the invention may be more fully understood an embodiment thereof will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a schematic perspective view of a packaging device and associated single use container in accordance with the invention, in a closed configuration
10 with the container fitted ready for use;

Figure 2 corresponds to the view of Figure 1 but with the device open to receive the container, prior to use;

Figure 3 corresponds to Figure 1 and shows the insertion of a closure member that is sealed to the container;

15 Figure 4 is a schematic perspective view of first example of a container;

Figure 5 is partially broken away perspective view of the container with one of its support rails in an open position;

Figure 6 corresponds to Figure 5 but with the support rail in a closed position;

Figure 7a is a partial sectional view of one side of the container when empty
20 taken along the line A-A' of Figure 5 with the support rail in the open position;

Figure 7b is a partial sectional view of the other side of the container when full of banknotes, taken along the line A-A' of Figure 5 with the support rail in the open position;

Figure 8 is a longitudinal, sectional view of the packaging device with the
25 container empty;

Figure 9a - 9d are views of the packaging device in transverse section illustrating operation of the drive mechanism to fill the container;

Figure 10 corresponds to Figure 8 but with the container full;

Figure 11 is a transverse section of another embodiment of the container;

30 Figure 12 is a longitudinal section of the container shown in Figure 11;

Figure 13 is a perspective view of a support rail of the container of Figures 11 and 12;

Figure 14 is a top plan view of the container shown in Figures 11 and 12;

Figure 15 is a sectional view of a container emptying device for emptying the contents of the container, ready for use;

Figure 16 is a sectional view of the emptying device after use; and

Figure 17 is a schematic perspective view of another embodiment of the invention in which the container does not have an integral spring.

10 The example of the invention illustrated in the drawings is for packaging banknotes and as used herein, the term "banknote" means a promissory note especially from a central bank or other governmental organisation payable to the bearer on demand for use as money, also known as "paper money" and in the USA as "currency" or a "bill".

15

Referring to Figure 1, a packaging device 1 is configured to receive individual banknotes 2 through an input slot 3 and stack them in a removable container 4. The packing device 1 may be mounted at a point of sale in a retail outlet, for example at a checkout in a supermarket so that banknotes can be packaged in container 4 and then transported securely to a remote location such as a cashier's office.

20

The packaging device 1 comprises a main body 5 and a frame 6 mounted on the main body to receive the container 4. The frame 6 is hinged on the main body 5 in this example, so that it can be moved between a closed position shown in Figure 1 to an open position shown in Figure 2, to act as a docking mechanism that allows the container 4 to be inserted and removed between the frame and the main body. The container 4 is a generally rectangular in configuration to be described in more detail hereinafter, with a peripheral lip 7. The frame 6 defines

25

an output port 8 through which the container 4 protrudes as shown in Figure 1, with its lip 7 sandwiched between the main body 5 and the frame 6.

Referring to Figure 3, when the container becomes full of banknotes 2, a closure member in the form of a sealing card 9 is inserted through a second input port 10 in the main body 5, to be heat sealed onto the container 4. Thus, when the frame 6 is opened as shown in Figure 2, a sealed container is provided containing the banknotes for transport to the cashier's office.

10 Referring to Figure 4, the container 4 is manufactured as a one piece moulding of a thermoplastics material and comprises a generally rectangular opening 11 bounded by the lip 7, a base 12, and sidewalls 13, 14, 15, 16 that extend from the base to the opening and the lip 7. The sidewalls 13, 14, 15, 16 are corrugated to provide rigidity.

15

The dimensions of the opening 11 are chosen to allow the insertion of a particular denomination of banknote, with the sidewalls 14, 16 being longer than sidewalls 13, 15.

20 The base 12 is moulded to include corrugations 17 that are disposed between a central, base support region 18 and the sidewalls 13, 16. In this example, the base support region 18 is elliptical but as will be evident hereinafter, other shapes can be used. The corrugations 17 act as a compression spring to urge the base support region 18 towards the opening 11 as successive banknotes are inserted
25 into the container.

Elongate, castellated wings 19, 20 are hingedly coupled to the lip 7 along the long sides of the container 4. The wings 19, 20 are initially in the configuration shown in Figure 4 and as a result, a plurality of containers 4 can be stacked one

within the other, enabling a supply of containers to be easily delivered and stored adjacent the packaging device at the point of sale, ready for use.

5 In order to prepare a container 4 for use in the packaging device 1, a relatively rigid rectangular platen 21 (not shown in Fig. 4 but illustrated in Fig. 8) is placed on the base support region 18. The platen 21 may comprise a moulded plastics member that couples to the base support region 18 by cooperating pegs and receptacles 22, or the platen 21 may simply be a rectangular piece of cardboard or similar material that rests on the base support region 18. The platen 21
10 extends to the sidewalls of the container 4 to support the banknotes. Thereafter, the wings 19, 20 are hinged inwardly from the position shown in Figure 4, in the direction of arrows X. As explained in more detail hereinafter, the wings 19, 20 when folded inwardly, act as guide rails to allow banknotes to be passed along them for insertion into the container 4 through the opening 11.

15

The wing 19 is shown in its initial, outwardly extending position in Figure 5 and its inwardly folded position in Figure 6. The wing 19 comprises a main guide surface 23 formed with a series of indentations that give rise to castellations 24, an outer lip 25, a hinge line 26 and a coupling surface 27 that connects the main
20 guide surface 23 to the hinge line 26.

When the wings 19, 20 are folded inwardly in the direction of arrow X, and the container 4 is inserted into the packaging device 1, the coupling surface 27 is welded to the lip 7 by the packaging device 1, in the region 28 shown in Figure
25 7b. In Figure 7a, the wing 19 is shown in its initial, outwardly extending position, with no banknotes 2 in the container and with the spring corrugations 17 in their initial, uncompressed state. Figure 7b illustrates the configuration when the container 4 has been filled with a stack 29 of banknotes 2. In this situation, the platen 21 has been compressed downwardly to accommodate the
30 stack 29 of banknotes thereby compressing the corrugations 17 in the base of the container 4. The wing 19 has been hinged inwardly in the direction of arrow X

and welded in region 28 against lip 7 so that the castellations 24 provide a downwardly depending stop to hold the stack 29 of banknotes within the container.

5 The way in which the packaging device 1 fills the container with banknotes will now be described in more detail. Referring to Figure 8, a cross sectional view of the packaging device is shown, with the container 4 received in frame 6, empty and ready to receive banknotes. The main body 5 includes an input path 30 that extends from the first input port 3 through a banknote sensing station S, to the
10 output port 8 in frame 6. When the banknote 2 is inserted into the first input port it is detected by an optical sensor 31 that activates driven roller pairs 32, 33 to drive the banknote 2 past a validation sensor arrangement 34 coupled to validation circuitry 35 mounted on a printed circuit board 36. The validation sensor arrangement 34 and associated circuitry 35 may correspond to our Ardac
15 technology described in United States Patent No.4,348,656. In the event that the banknote 2 is determined to be a true banknote as opposed to a fraud by the sensor arrangement 34 and associated circuitry 35, the drive roller pairs 32, 33 transport the banknote 2 towards the output port 8. Otherwise, the roller pairs 32, 33 are driven in reverse so that the banknote 2 is ejected from the input port
20 3.

Assuming that the banknote 2 is acceptable, it is passed by the rollers 32, 33 towards a banknote drive mechanism, which in this example includes a pair of drive belts 37, 38 shown more clearly in Figure 10a, which engage longitudinal
25 side edges of the banknote and move it into alignment with the output port 8. Considering the belt 38 in more detail, it extends between pulleys 39, 40 which are driven by a motor 41 in the direction of arrows Y such that the banknote is drawn by the belts 37, 38 in a direction transverse to its major face along the input path until it becomes aligned with the output port 8.

The banknote drive mechanism also includes a plunger 42 in the form of a rigid plate that is mounted for movement downwardly between the belts 38,39 so as to drive the banknote 2 into the container 4. To this end, a motor 43 drives two pairs of elliptical cams 44, 45 through a drive train 46, 47 illustrated schematically in dotted outline. In use, the cams 44, 45 rotate in the direction of arrows Z (shown in Figure 9) to drive the plunger 42 together with the banknote 2, into the container 4 through the opening 11, in a direction perpendicular to the plane of the banknote when it arrives at the opening 11 along the input path 30.

This process is shown in more detail in Figures 9a - 9d. Referring to Figure 9a, the banknote 2 is driven by belts 37, 38 along the main guide surfaces 23 of the inwardly folded wings 19, 20. The main guide surfaces 23 act as rails to support the longitudinal side edges of the banknote 2. When the banknote becomes aligned with the output port 8 in frame 6, the motor 42 is operated to rotate the cams 44, 45 downwardly as shown in Figure 9b. As a result, the plunger 42 is moved downwardly in the direction of arrow D so that the belts 37, 38 are moved downwardly into the container past the wings 19, 20 thereof. Side edges 2a, 2b of the banknote deform so that they withdraw from the main guide surfaces 23 as the plunger 42 moves downwardly past the castellations 24, so that the entire banknote 2 is moved into the container 4. As the cams 44, 45 continue to rotate, the plunger 42 and the banknote 2 are driven downwardly against the platen 21, such as to compress the spring 17; thereby allowing the side edges 2a, 2b of the banknote to lie flat and become disposed underneath the castellations 24.

The cams 44, 45 are then rotated to their initial position ready to engage the next banknote 2' shown in Figure 9c. Thus, the banknote 2 is inserted into the container 4 and it held therein by the compressive force of spring 17, against the castellations 24, which act as a stop to hold the banknote in the container 4.

Successive banknotes are inserted into the container to form the banknote stack 29 of shown in Figure 9d, with the uppermost banknote being held under the castellations 24.

5 Figure 10 shows the stack 29 in the container 4, with the platen 21 having been moved downwardly. The compressive force of spring 17 urges the stack 29 upwardly against the castellations 24 to hold the banknotes securely within the container.

10 When the container 4 is full, and operator inserts the closure member 9 through the second input port 10. The closure member 9 comprises an optically transparent or translucent sheet of plastics material. The closure member 9 is detected by an optical sensor 48 and moves along a closure member inlet path 49 that extends into the input path 30 for banknotes, so as to become engaged with
15 and driven by the drive belts 37, 38 until it becomes aligned with the output port 8, in a similar manner to the stacking of the banknotes. The closure member 9 thus becomes positioned over the inlet 11 of the container 4 with the side edges of member 9 extending over the main guide surfaces 23 of the wings 19, 20 on the longer sides of the container, and also over the lip 7 on the shorter sides of
20 the container. As shown in Figure 9d, the main body 6 of the packaging device includes electrical heaters 50. In use, when the closure member 9 becomes aligned with the opening 11 of the container, the heaters 50 are switched on so as to heat seal the closure member 9 onto the wings 19, 20 and also to weld the wings themselves onto the rim 7 of the container i.e. to produce the weld 28
25 shown in Figure 7.

As shown in Figure 10, the main body 5 includes a print head 51 operable to print data on the underside of the closure member 9 so that when sealed onto the container 4, the information is within the container and cannot be altered
30 except by opening it. The print head 51 is operable to print in a mirror image so that the data can be read normally through the transparent closure member 9

from outside the container 4. The circuitry 35 is operable to collate data concerning the number and denomination of banknotes that have been stacked in stack 29 in the container 4 and this data can be printed on the underside of the closure member 9 using the print head 51.

5 After sealing of the closure member 9 on the container 4, the frame 6 can be opened as shown in Figure 2 and the sealed container can be transported to another location, for example to the cashiers office. The resulting packaged banknotes cannot readily be tampered with during transport because the closure
10 member 9 is heat sealed to the container 4 protecting its contents. If the sealed container 4 is opened, this is readily apparent and the container cannot be subsequently reused in the packaging device. Thus, the risk of fraud is materially reduced. Also, the printing of data corresponding to the contents of the container on the inside of the closure member means that the printed indicia
15 cannot readily be abraded or otherwise altered.

Figures 11 to 14 illustrate a modified version of the container 4, which obviates the requirement for a separate platen 21. In the container of Figure 4, the platen 21 provides a rigid support for the relatively flexible banknotes as they become
20 stacked in the container so that side edges of the banknotes can be reliably abutted against the undersides of the castellations 24. Without the relatively rigid platen 21, the relatively flexible banknotes may tend to curve around the base support region 18 and the spring region 17 in a domed configuration such that the banknotes are not reliably held on the undersides of the castellations 24.
25 In the container shown in Figure 11 to 14, the platen is formed integrally in two parts 21a, 21b with the base 14 of the container 4. As shown in Figure 11, the platen 21a extends substantially the entire width of the container 4 so that the stack 29 of banknotes within the container is supported across the entire width of the banknotes by the relatively rigid platen 21a. The corrugated regions 17a
30 around the platen 21a give rise to an integral compression spring with the main compressive force being given by regions 17a' shown in Figure 12 with the

longitudinal portions 17a" providing less of a spring effect. It will be understood that the platen region 21b is configured in a similar manner with surrounding integral springs 17b.

5 Figure 14 illustrates the container 4 in plan view with the closure member 9 heat sealed onto the wings 19, 20 and the flange 7. Printed data 52 on the underside of the closure member 9 has been printed thereon by means of the print head 51 shown in Figure 8.

10 The closure member 9 includes a line of weakness 53 to facilitate opening the container 4 when filled with banknotes. The closure member 9 can be manually depressed downwardly in the centre thereof so as to cause the closure member 9 to tear along the line of weakness 53. The contents can then be removed.

15 It will be understood that according to the invention, the container cannot be reused for packaging banknotes in the packaging device 1 once the container has been opened, providing a clear visual indication of whether the packaging device has been tampered with after closure. Moreover, when opened, the data printed on the closure member can be used to verify the contents of the container 4.

20

The process of opening the container can be automated by means of a device illustrated in Figures 15 and 16. The device empties the contents of the container 4 into a tray 54 received on a support 55 beneath a platform 56 that includes a release aperture 57 with dimensions corresponding to the opening 11
25 of the container. In use, the container 4 is placed upside down with opening 11 coextensive with the release aperture 57. A ram 58 is operated downwardly in the direction of arrow R with sufficient force to collapse the sidewalls 13, 14, 15, 16 of the container 4 and press the stack 29 of banknotes against the closure member 9, causing it to burst along the line of weakness 53. Continued
30 movement of the ram 58 in the direction of arrow R causes the banknotes to deform past the castellations 24 and drop into the tray 54 as shown in Figure 16.

The tray can then be removed from the device. The ram 58 is released and the remains of the container 4 are discarded.

Another embodiment of the invention is shown in Figure 17, which is generally similar to the example shown in Figures 1 to 3, with the modification that the container 4 does not contain an integrally moulded spring in its base and instead the spring function is performed by an external loading box 59 which fits onto the underside of the frame 6.

10 The container 4 is integrally moulded in a plastics material and has a generally rectangular lip 7 and wings 19, 20 that function as previously described, with concertina side walls 60, 61, 62, 63 that extend to a planar base 64. The container 4 is placed in the packaging device as previously described, within the frame 6, and the loading box 59 is fitted to its underside. The concertina side walls 60-63 do not exhibit any significant spring function on the notes stacked in the container 4. Instead, the loading box 59 contains a platen 65 which is urged by compression springs 66 against the base 64 of the container 4 whilst the banknotes are being stacked therein by the packaging device 1. A closure member 9 is then inserted through inlet 10 and heat sealed onto the container 4 as previously described. The sealed container is then removed from the frame 6 and the loading box 59 for transport to a remote location where it is opened under secure conditions and then disposed of, having performed its useful function and no longer being capable of receiving a stack of banknotes from the packaging device 1.

25

Many modifications and variations of the described embodiments fall within the scope of the invention. For example, whilst the packaging of banknotes has been described, other sheet objects with an attributable monetary value can be packaged in accordance with the invention, such as tokens or coupons, which may be bar-coded, and vouchers providing a discount or other promotional scheme.

30

Also, instead of or in addition to the printing carried out by the print head 51, a radio frequency identification (RFID) tag may be included on or in the container 4 or the closure member 9. This may be in the form of a printed coil or other techniques may be used as known in the art such as described in WO9935610. The tag may contain a small amount of data so that if a person attempts to take the sealed container containing the banknotes from the premises, the data can be detected using r.f. detectors to set off an alarm.

Claims

1. A packaging device for packaging a stack of sheet objects that have an attributable monetary value in a container, comprising:
 - an output port for supplying sheet objects to be stacked in the container,
 - a docking mechanism to receive the container, so that an opening in the container can receive the sheet objects from the output port,
 - a drive mechanism for driving the sheet objects to the output opening, and for supplying the sheet objects through the opening into the container to be stacked therein, and
 - a sealing device to seal a closure member onto the container opening whilst held by the docking mechanism so as to seal the stacked sheet objects within the container] such that the sealed container cannot be opened without rendering it subsequently unusable for packaging sheet objects in the packaging device.
2. A device according to claim 1 including a printer to print data relating to the sheet objects supplied into the container.
3. A device according to claim 2 wherein the printer is operable to print the data onto the closure member.
4. A device according to claim 3 wherein the printer is operable to print the data onto a side of the closure member that after sealing is on the inside of the container.
5. A device according to any preceding claim including an input path for the sheet objects, the drive mechanism being operable to drive the sheet objects along the input path with their major faces extending along the path, to the output port, and to drive the sheet objects in a direction transverse to their major faces through the output port into the container, whereby to create a stack of the sheet objects in the container.

6. A device according to any preceding claim including first input port to receive the sheet objects, and a second input port to receive the closure member, the drive mechanism being operable to drive the objects and the closure member to the output port.

7. A device according to claim 5 or 6 including a main body and a releasable frame mounted on the main body, the frame including said output port and being configured so that when released from the main body the container can be fitted in the output port on the frame and then when mounted on the main body the container is clamped between the frame and the main body.

8. A device according to claim 7 wherein the input path extends between the frame and the main body.

9. A device according to claim 7 or 8 wherein the sealing means comprises an electric heater on the main body or the frame.

10. A device according to any preceding claim including a sensor to sense sheet objects and counting circuitry for counting them.

11. A device according to any preceding claim including discrimination circuitry for discriminating between true and false sheet objects.

12. A device according to claim 11 is operable to determine the monetary value attributable to true sheet objects.

13. A device according to any preceding claim including a spring loaded platen to compress stacked sheet objects in the container.

14. A device according to claim 13 wherein the spring loaded platen is within a loading box attached to the docking mechanism.

15. A device according to any preceding claim and including the container.

16. A device according to claim 15 wherein the container comprises an opening to receive the sheet objects, a base, sidewalls extending towards the opening from the base, support rails coupled to the side walls on opposite sides of the opening, past which in use the sheet objects resiliently deform when placed in the container in a stacked configuration through the output port.

17. A device according to claim 16 wherein the support rails each include a main guide surface to guide a side edge region the sheet members along the input path, and castellations for providing a stop against which the stack of sheet objects abuts when in the container.

18. A device according to claim 16 or 17 including a spring in the base operable to urge stacked sheet objects in the container against the support rails, the container being configured to receive the closure member sealed thereto over the opening.

19. A device according to claim 18 wherein the base is integral with the sidewalls and resiliently coupled thereto to provide the spring.

20. A device according to claim 16 or 17 wherein the sidewalls have a concertina configuration.

21. A packaging system for packaging a stack of sheet objects that have an attributable monetary value, comprising

(i) a packaging device comprising:

an output port for supplying sheet objects to be stacked in the container,

a docking mechanism to receive the container, so that an opening in the container can receive the sheet objects from the output port,

a drive mechanism for driving the sheet objects to the output opening, and for supplying the sheet objects through the opening into the container to be stacked therein, and

a sealing device to seal a closure member onto the container opening whilst held by the docking mechanism so as to seal the stacked sheet objects within the container

(ii) at least one container configured to be filled with a stack of sheet objects by the packaging device, and

(iii) a closure member to be sealed by the sealing device onto the container.

22. A container configured for use in a packaging system as claimed in claim 21.

15

23. A container for packaging sheet objects with an attributable monetary value, comprising an opening to receive the sheet objects, a base, sidewalls extending towards the opening from the base, support rails coupled to the side walls on opposite sides of the opening, past which in use the sheet objects resiliently deform when placed in the container in a stacked configuration, the container being configured to receive a closure member sealed thereto over the opening so that the container cannot be reused for stacking sheet objects once opened.

24. A container according to claim 23 wherein the support rails are hinged on opposed ones of said sidewalls for movement from a storage position exteriorly of the opening, to an operative position within the opening.

25. A container according to claim 23 or 24 wherein the support rails each include a main guide surface to guide a side edge region the sheet members to be stacked within the container; and castellations for providing a stop against which the stack of sheet objects abuts when in the container.

26. A container according to any one of claims 23 to 25 wherein the base is integral with the sidewalls and resiliently coupled thereto to provide a spring operable to urge stacked sheet objects in the container against the support rails.

27. A container according to any one of claims 23 to 25 wherein the sidewalls are arranged in a concertina configuration.

28. A container according to any one of claims 23 to 26 including a platen on the base, the platen being configured to receive the stack of sheet members.

29. A container according to any one of claims 23 to 28, integrally moulded.

30. A container according to claim 29, integrally moulded in a plastics material.

31. A container according to claim 26 wherein the platen comprises a discrete element on the base.

32. A container according to claim 26 wherein the platen is integral with the base.

33. A container according to claim 32 wherein the base includes a plurality of platen portions each resiliently biased towards the support rails.

34. A container according to any of claims 23 to 33 wherein a plurality thereof can stack one within the other.

35. A container according to any one of claims 23 to 34 and including the closure member.

36. A container according to any one of claims 23 to 35 and including the closure member sealed to the opening.

5 37. A container according to claim 36 wherein the closure member has been heat-sealed thereon.

38. A container according to 35, 36 or 37 wherein the closure member includes a line of weakness along which it can subsequently tear to facilitate removal of the sheet objects.

10

39. A container according to any one of claims 23 to 38 containing a stack of said sheet members.

15 40. A container according to claim 39 wherein the sheet members comprise banknotes or like promissory notes of attributable monetary value.

41. A container according to claim 39 or 40 wherein data relating to said stack of sheet members is printed on the closure member.

20 42. A container according to claim 41 wherein the data is printed on the inside of the closure member.

43. A container according to any one of claims 23 to 42 with a RFID device.

25 44. A device for removing sheet objects from a container according to any one of claims 23 to 43 including a support for the container around the periphery of its opening, ram to apply a force to the base to drive it towards the opening and to collapse the side walls and cause the sheet objects to burst open the closure member so that the sheet objects move out of the container through
30 the opening.

45. A method of removing sheet objects from a container according to any one of claims 23 to 44 including applying a force to the base of the container to drive it towards the opening and cause the sheet objects to burst open the closure member so that they move out of the container through the opening.

5

46. A packaging device for packaging a stack of sheet objects that have an attributable monetary value in a container, comprising:

an output port for supplying sheet objects to be stacked in the container,
a docking mechanism to receive the container, so that an opening in the
10 container can receive the sheet objects from the output port,
a drive mechanism for driving the sheet objects to the output opening,
and for supplying the sheet objects through the opening into the container to be stacked therein, and

a sealing device to seal a closure member onto the container opening
15 whilst held by the docking mechanism so as to seal the stacked sheet objects within the container.

47. A packaging device substantially as herein described with reference to the accompanying drawings.

20

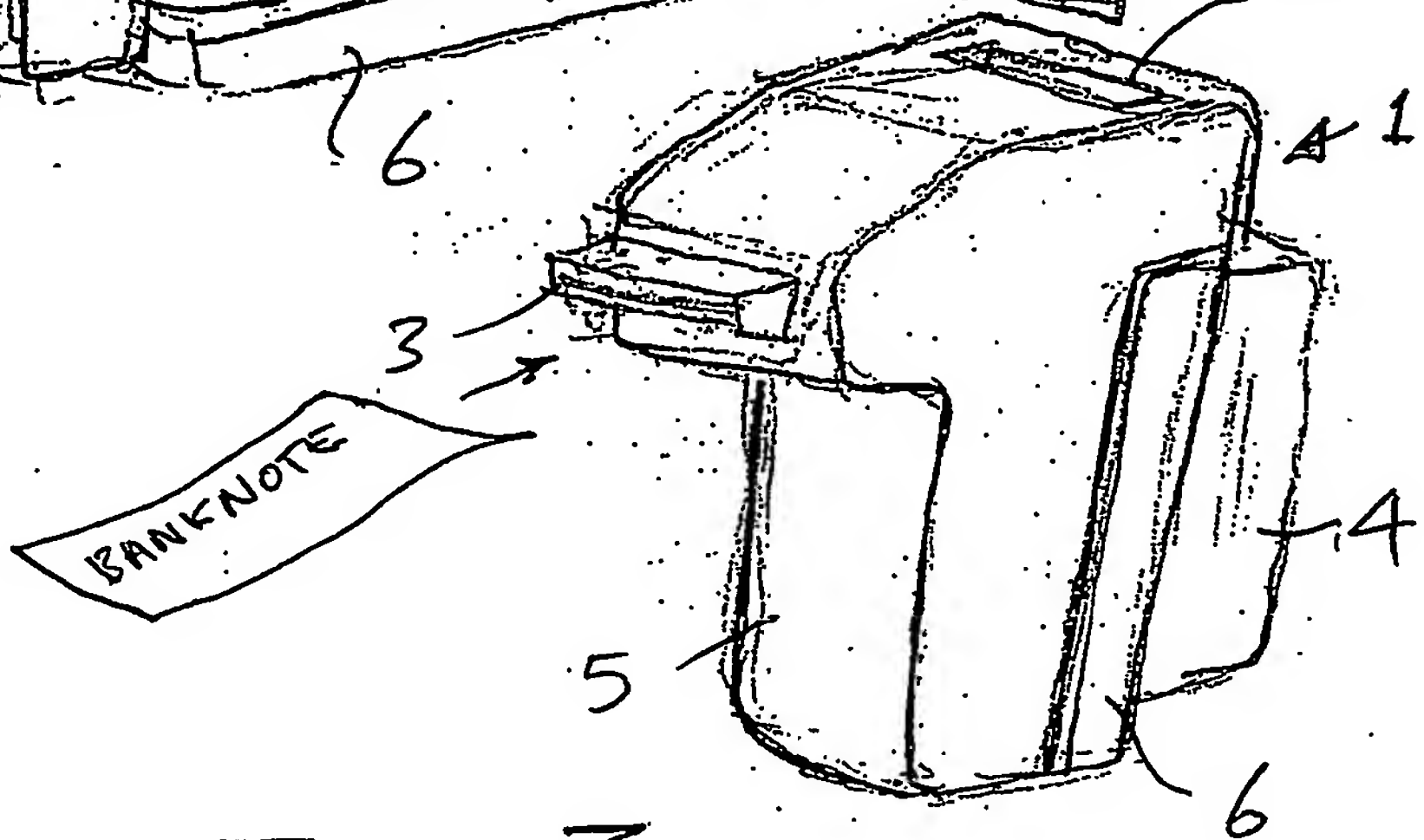
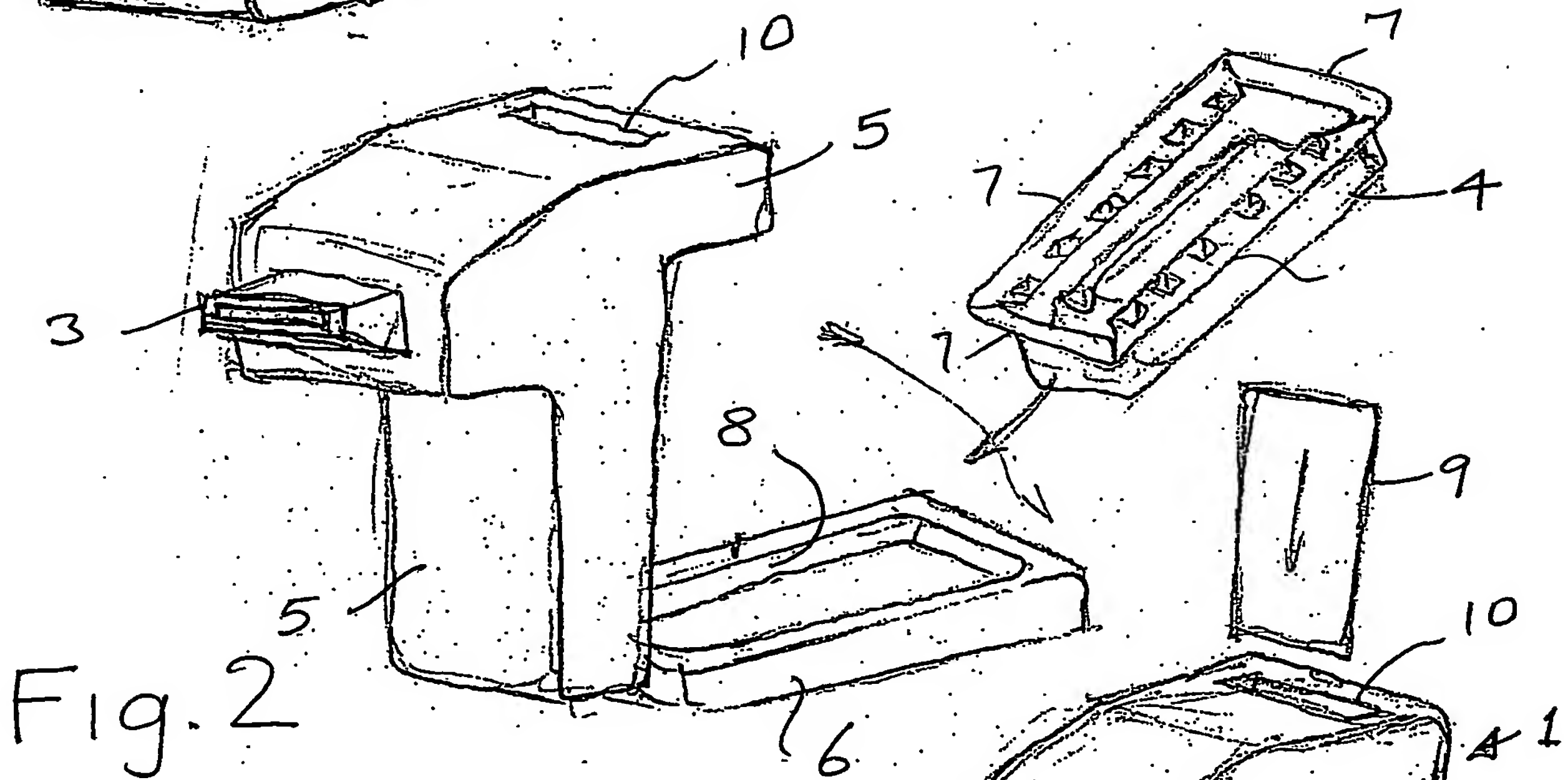
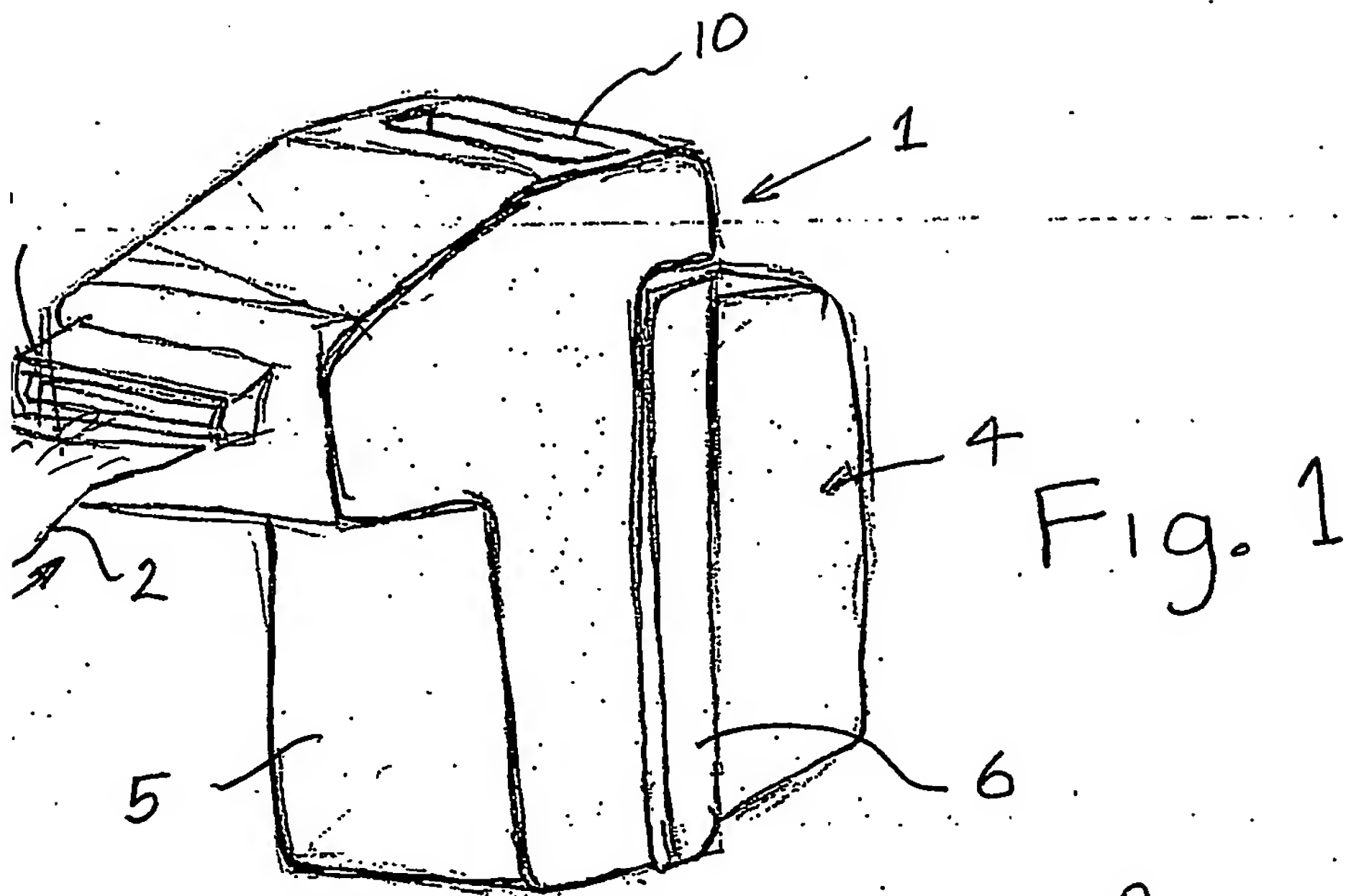
48. A container substantially as herein described with reference to the accompanying drawings.

49. An emptying device substantially as herein described with reference to
25 the accompanying drawings.

Abstract

Packaging device and container for sheet objects

A device (1) packages a stack of sheet objects such as banknotes (2) in a container (4) sandwiched between a frame (6) and the device's main body (5). Banknotes are fed through a first input port (3) to be stacked in the container. A closure member (9) is inserted through a second input port (10) and heat-sealed onto the container (4) when full. The container (4) is integrally moulded in a plastics material with inwardly hinged wings (19,20) that act as guide rails for banknotes as they are fed towards opening (11) of the container by a drive mechanism the packaging device. The wings have castellations (24) that hold edges of banknotes (29) in stacked in the container by the drive mechanism. A printer (51) prints data concerning the stacked banknotes on the underside of the closure member (9). The packaged container is opened by a device that compresses it so that the closure member (9) bursts along a line of weakness (53).



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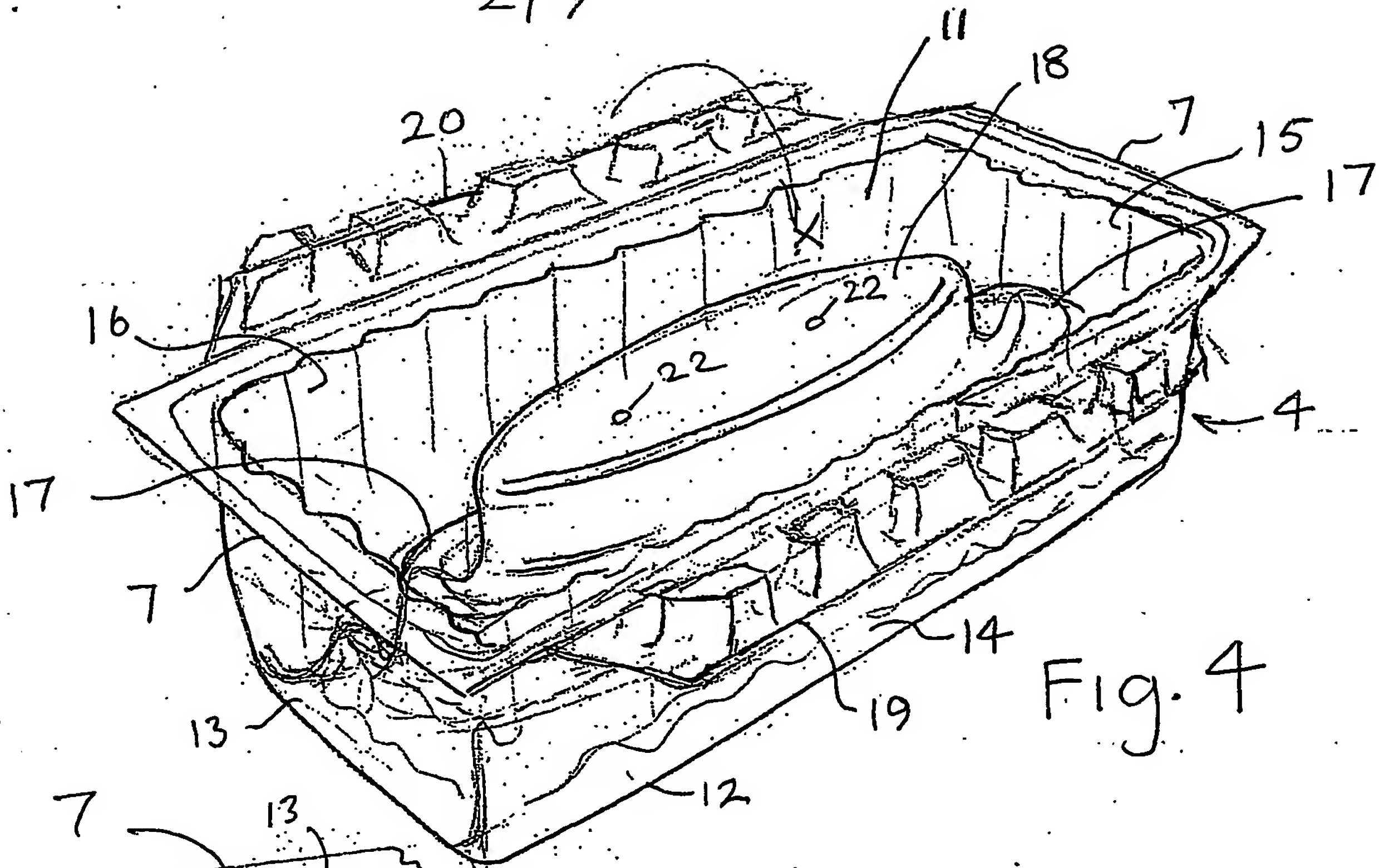


Fig. 4

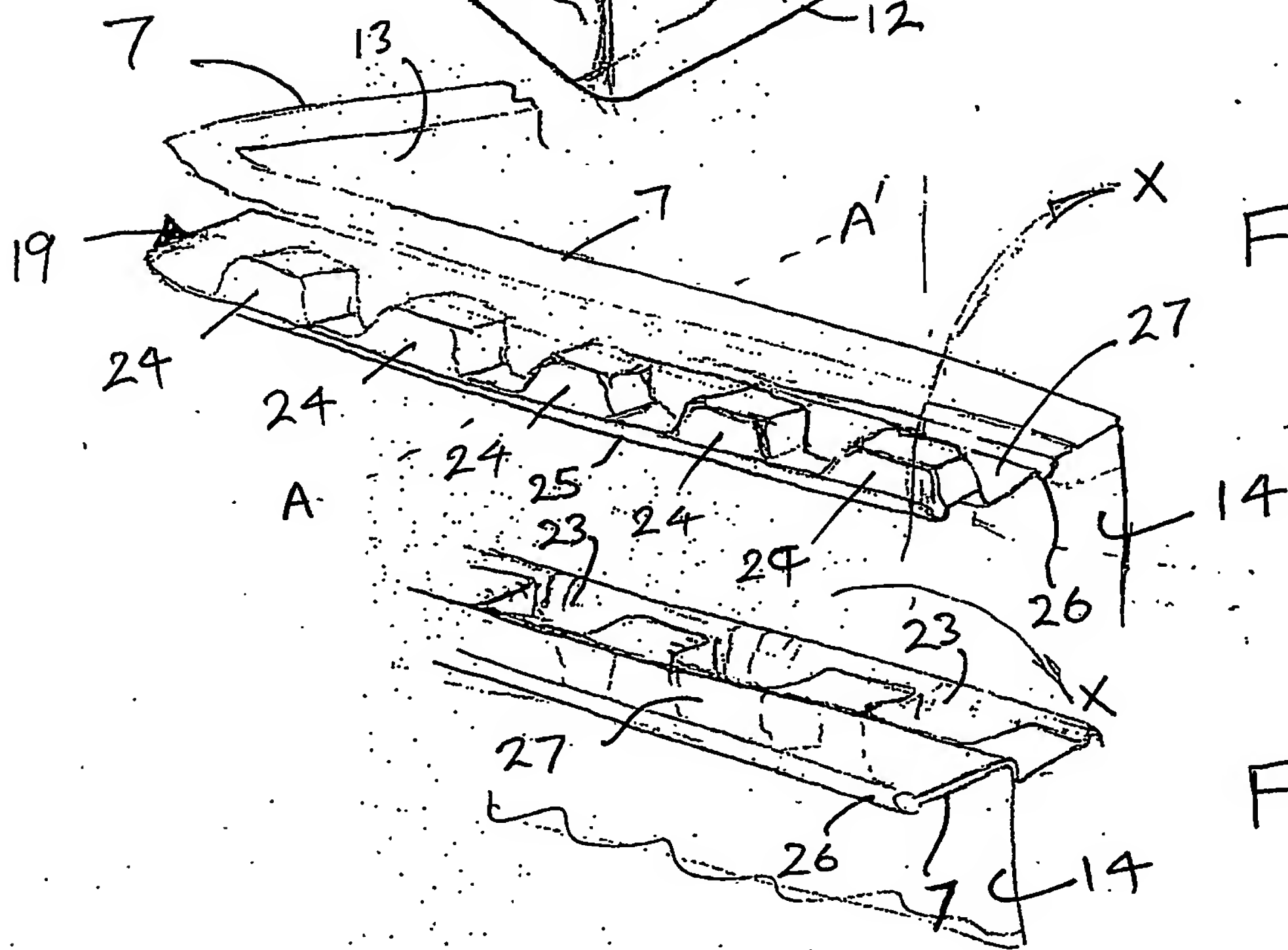


Fig 5

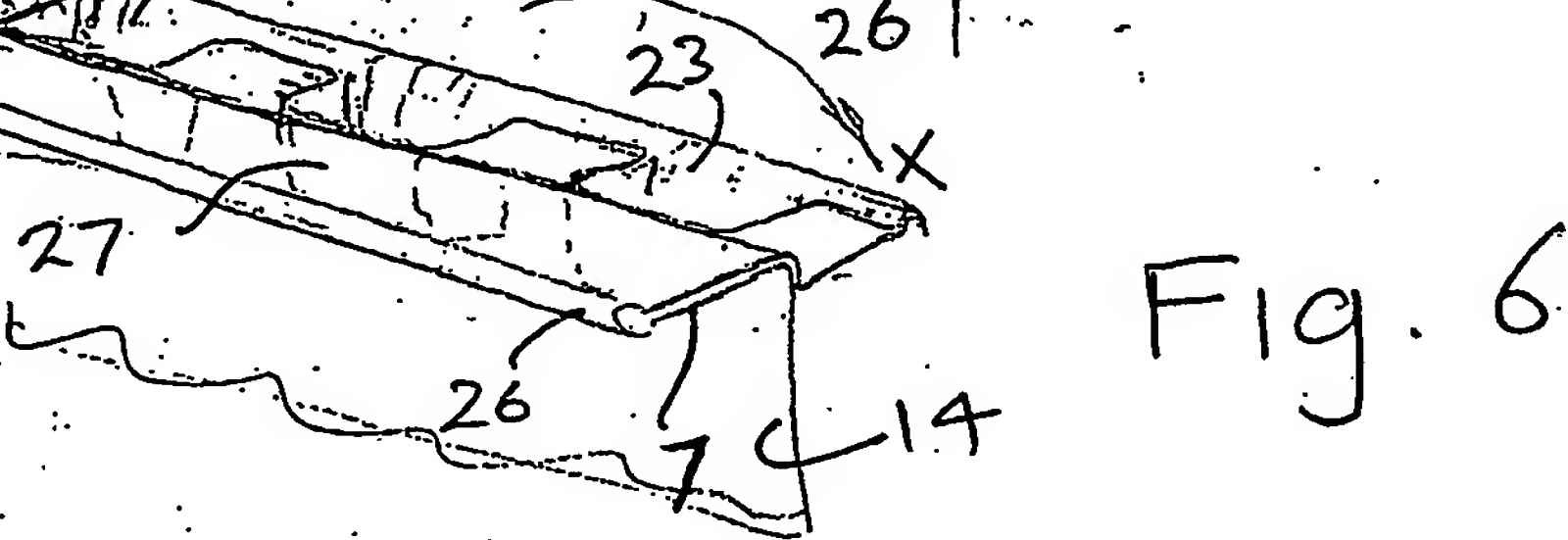


Fig. 6

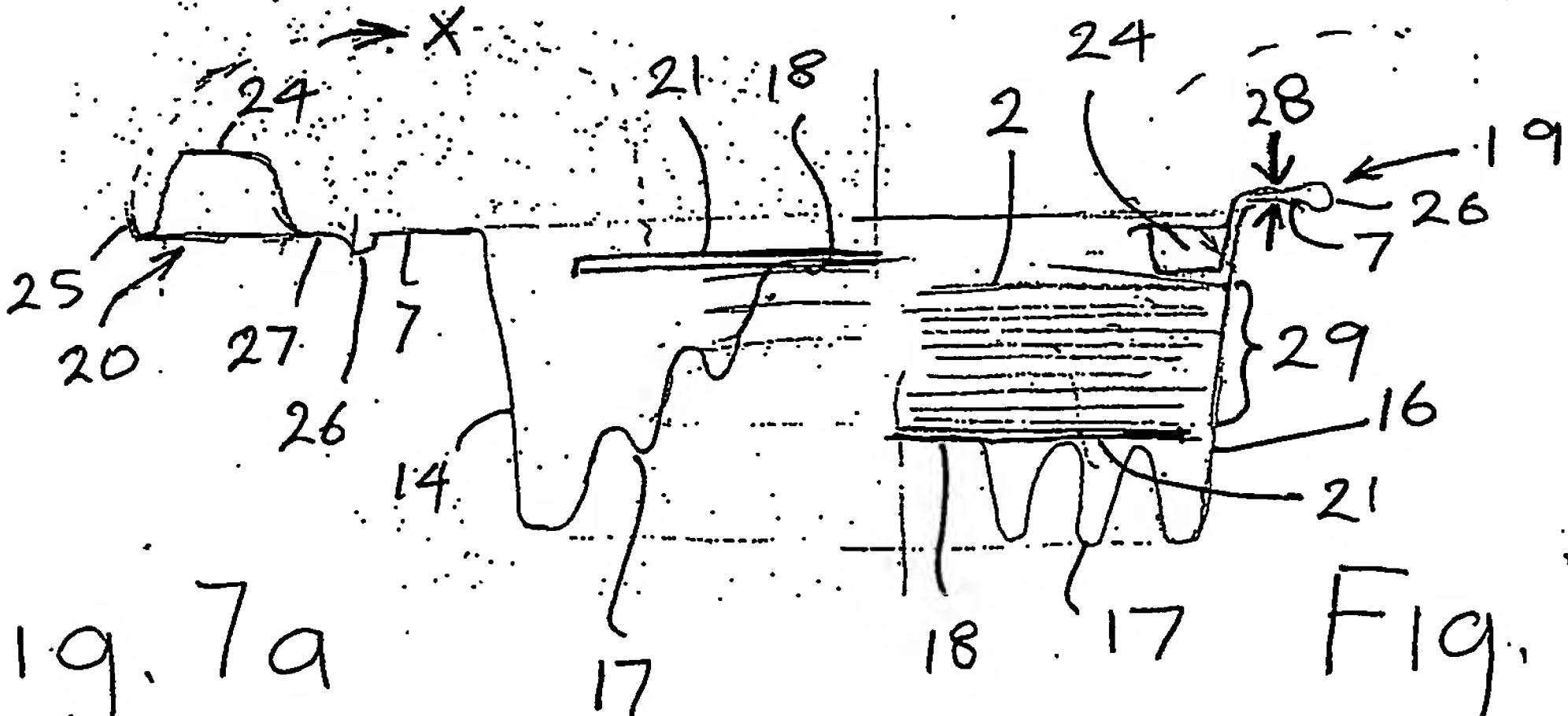
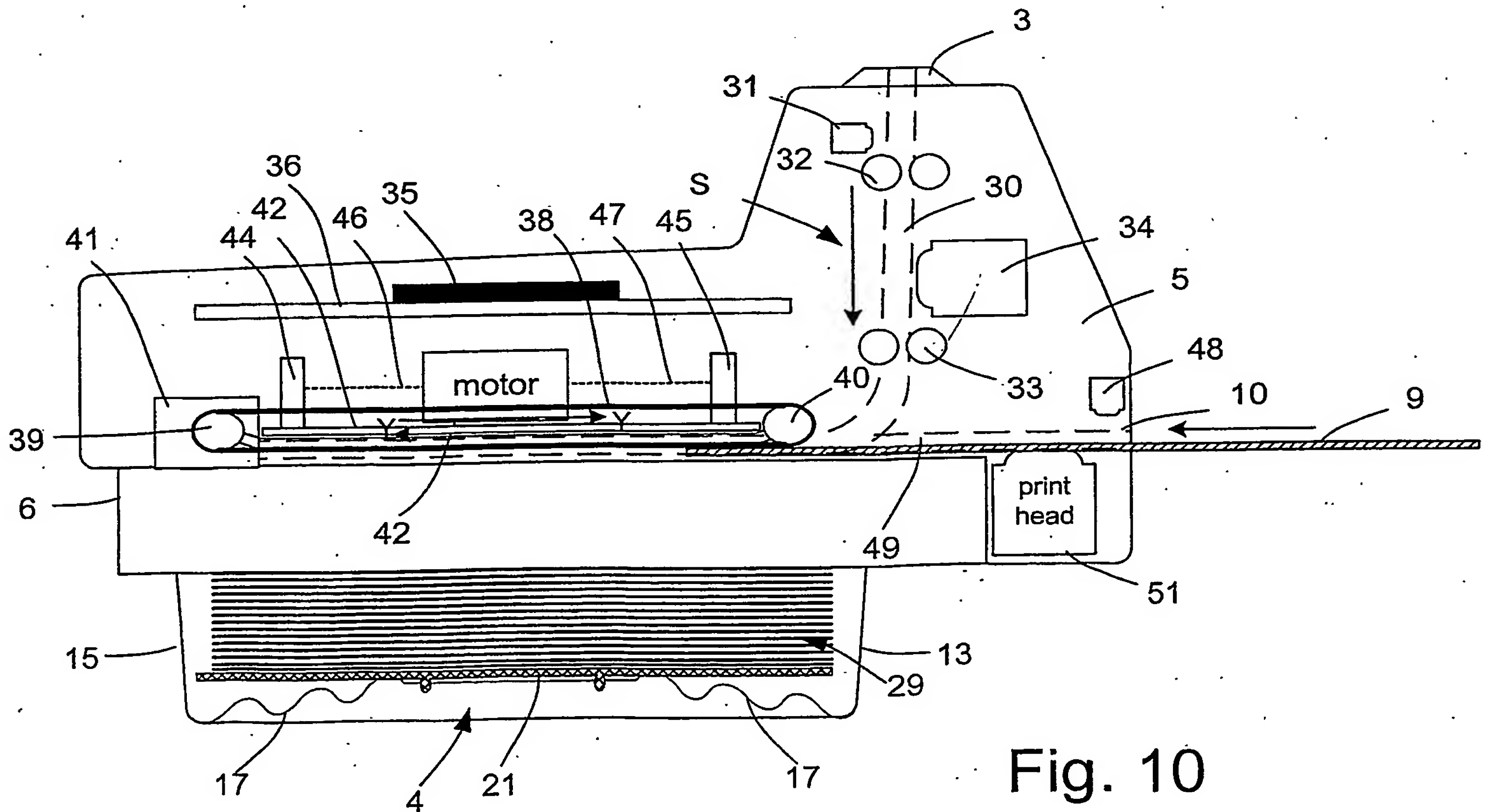
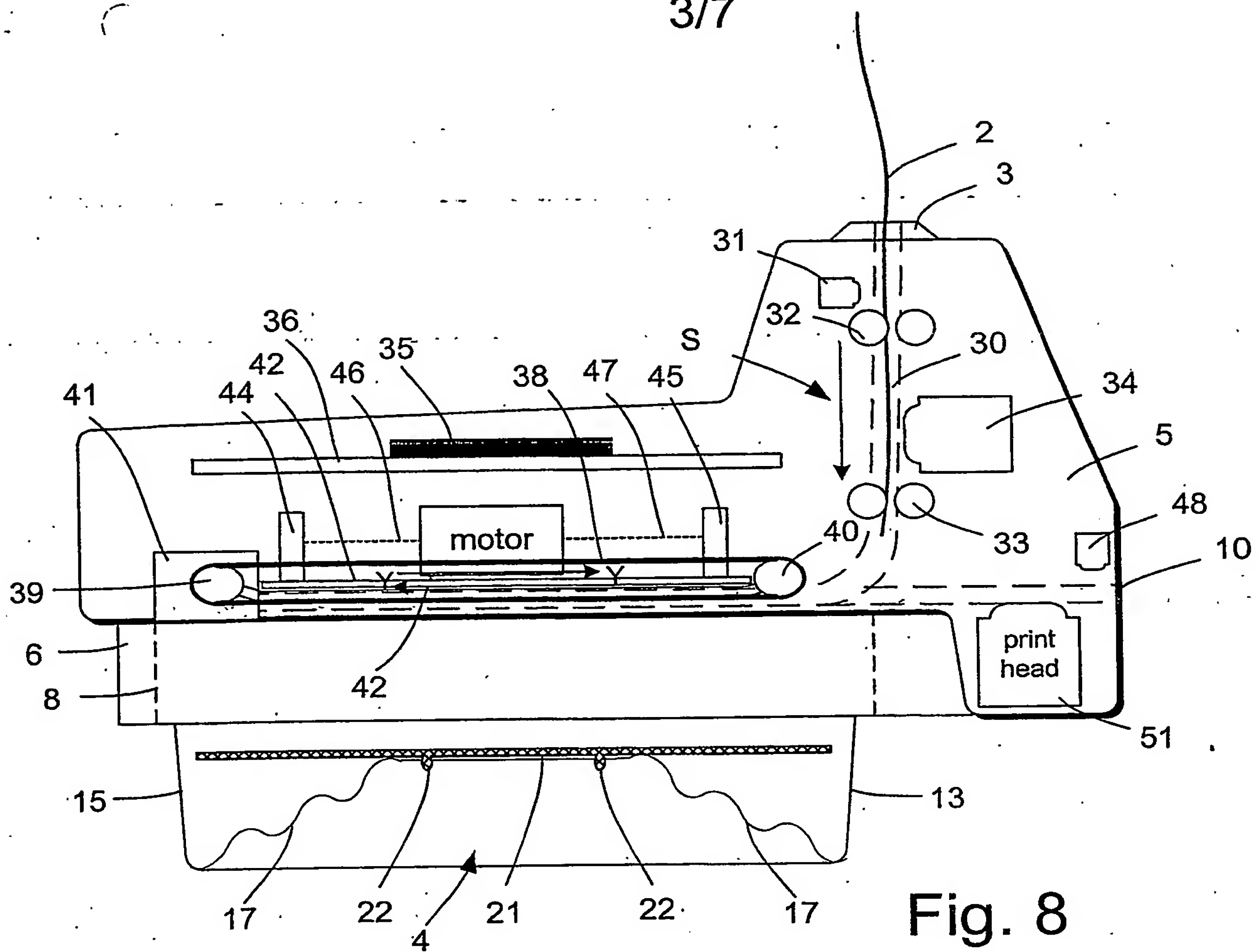


Fig. 7a

Fig. 7b



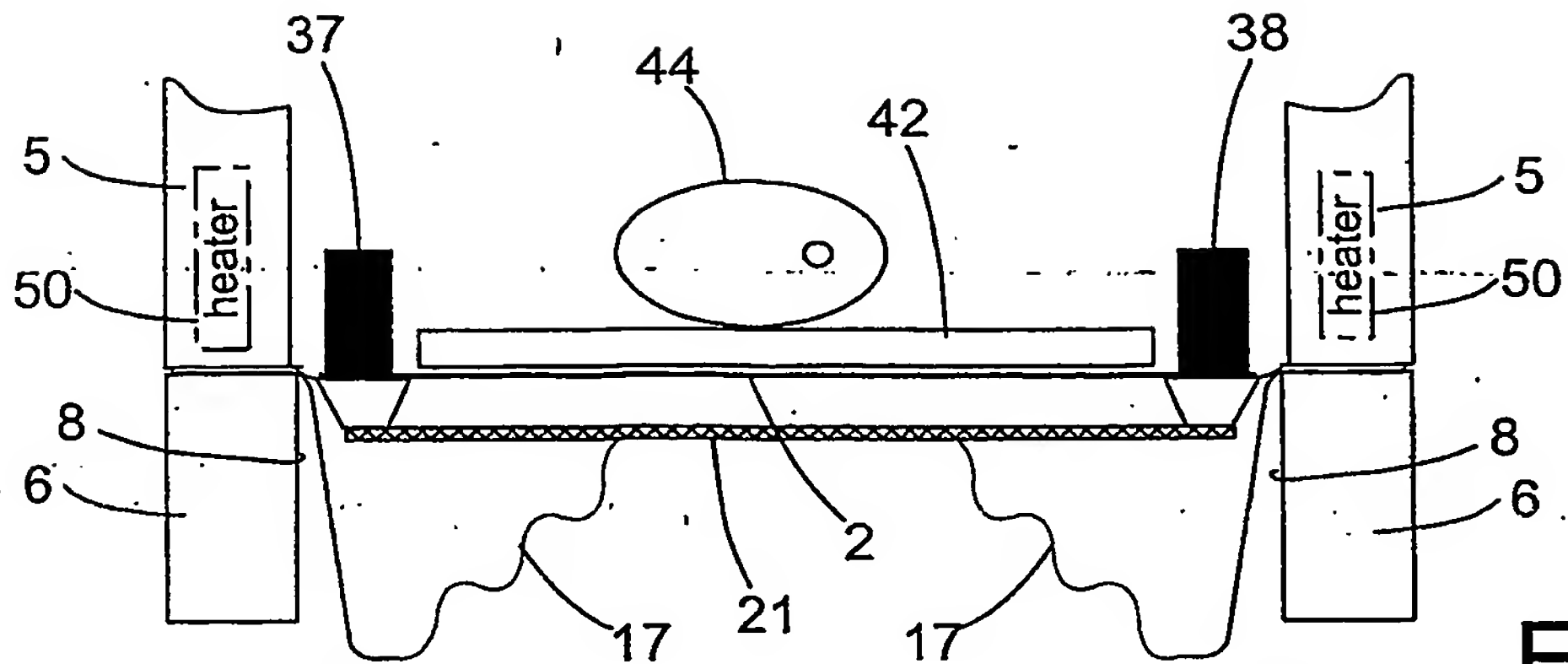


Fig. 9a

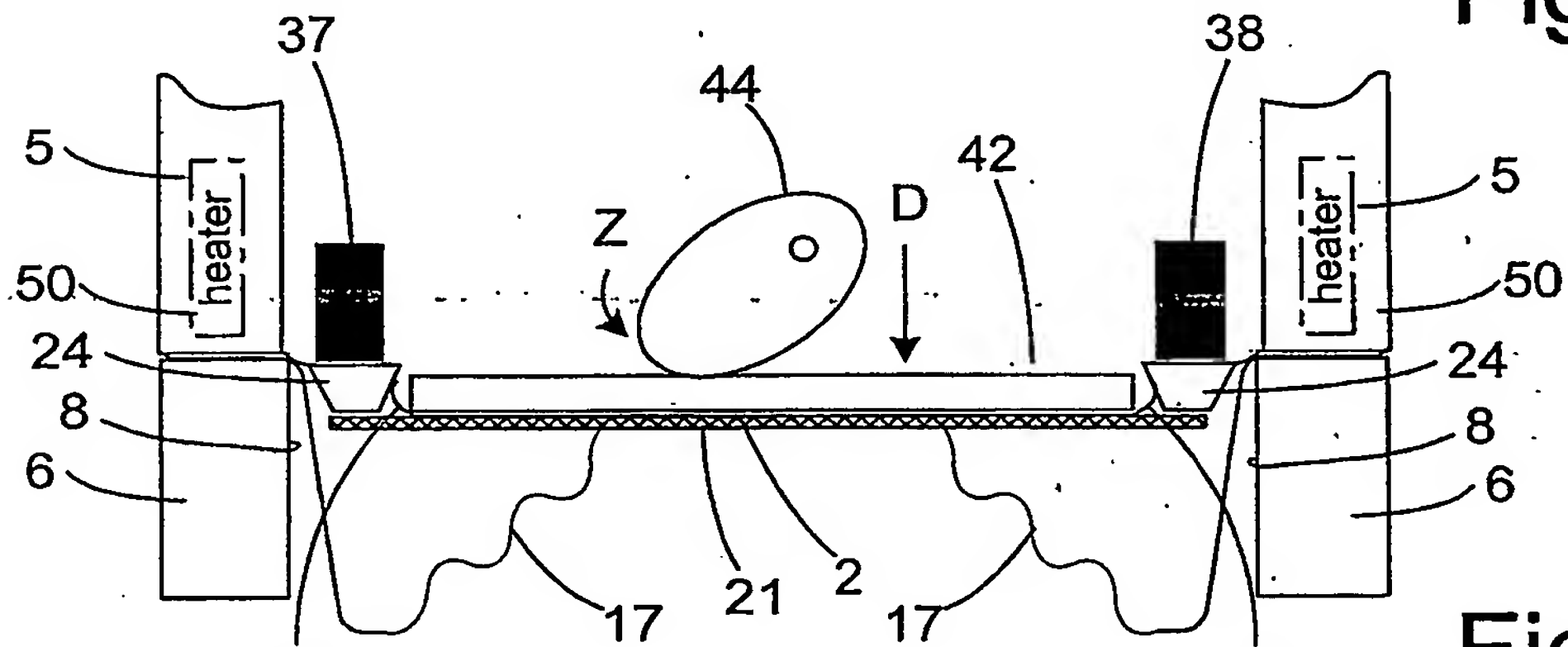


Fig. 9b

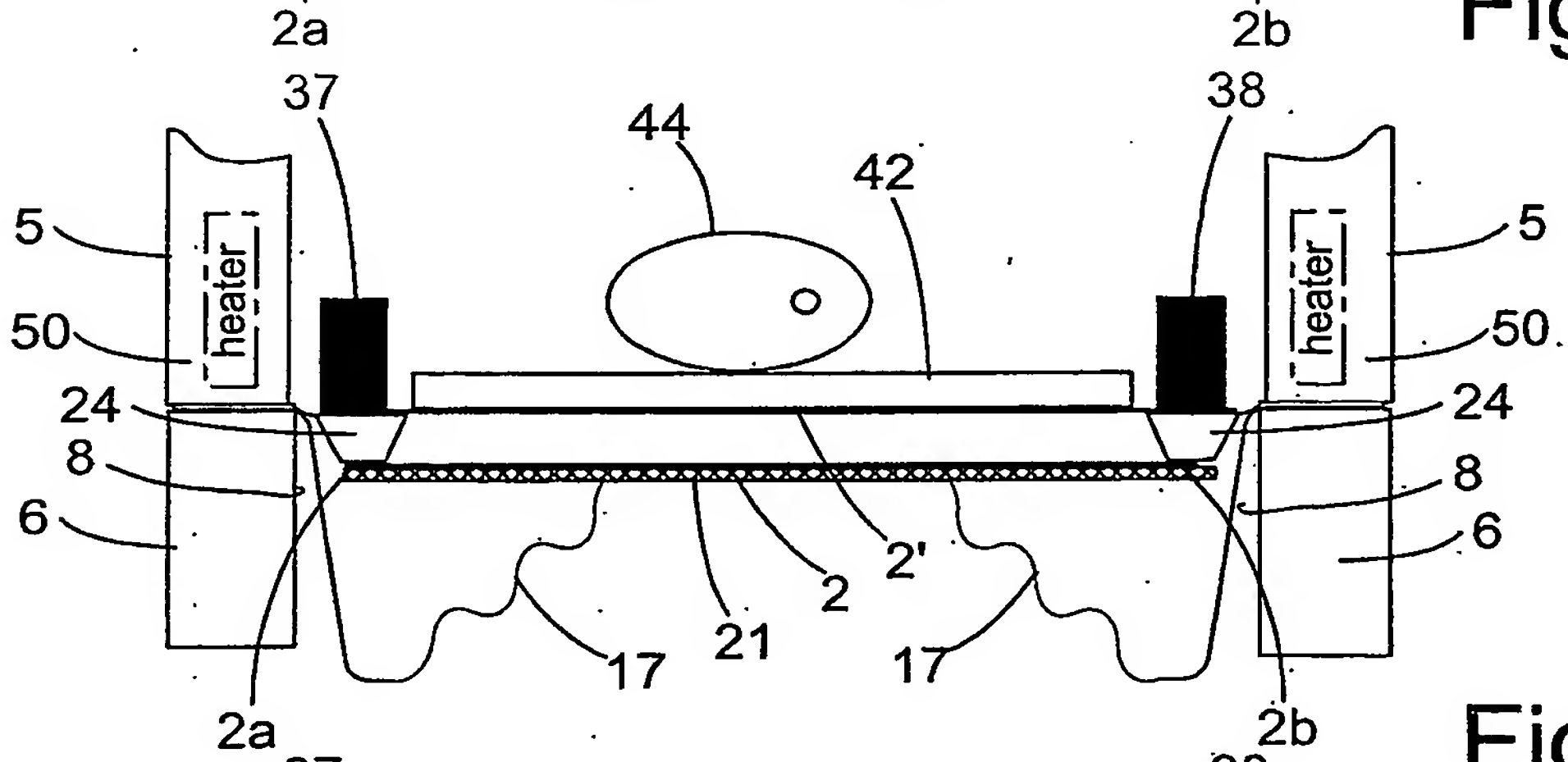


Fig. 9c

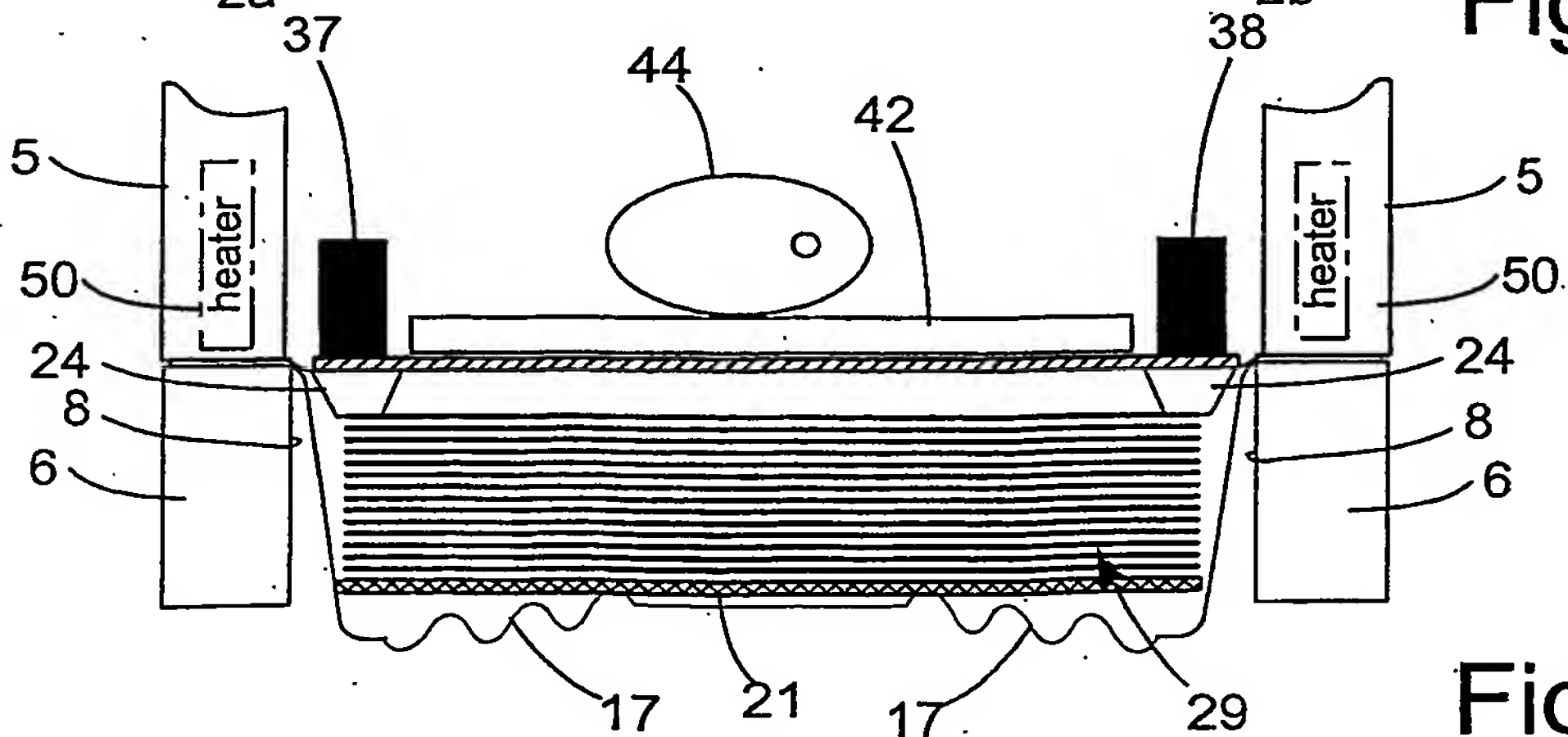


Fig. 9d

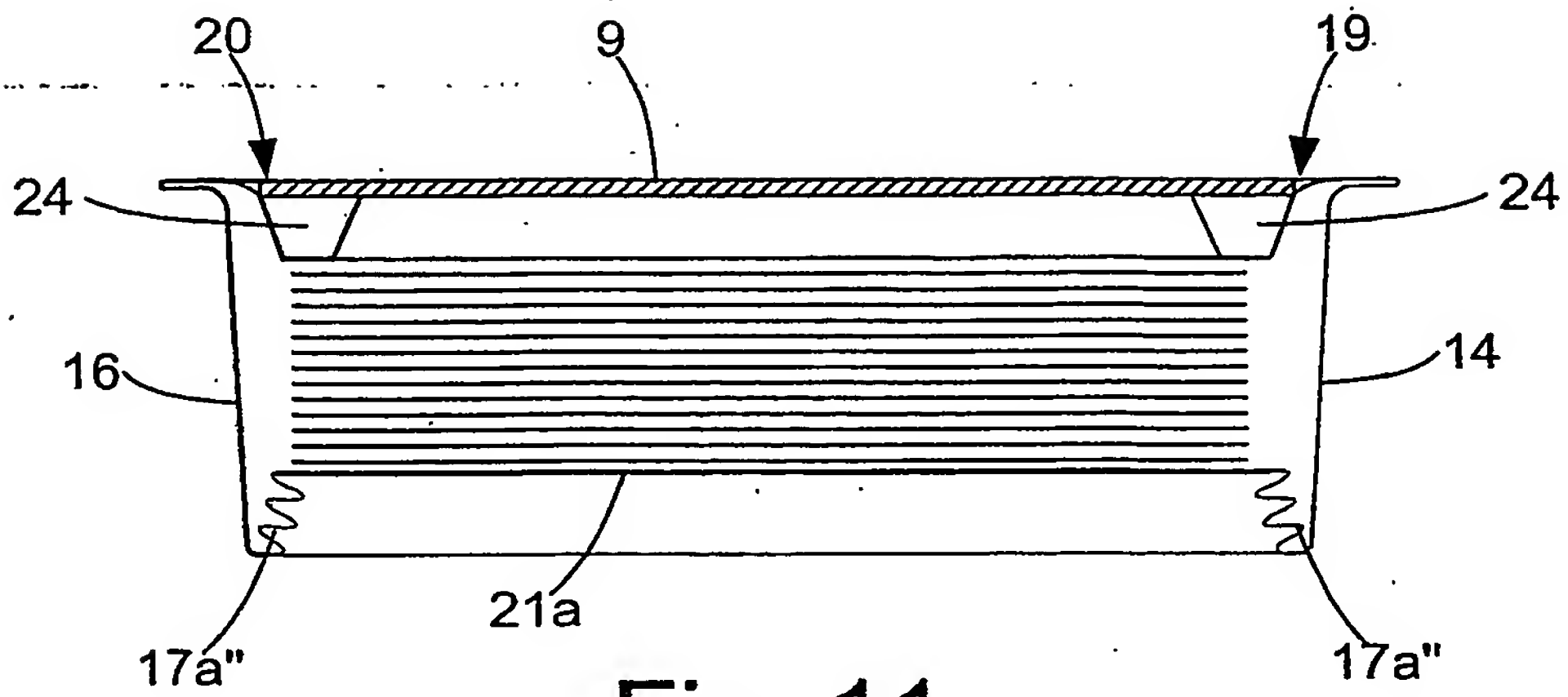


Fig. 11

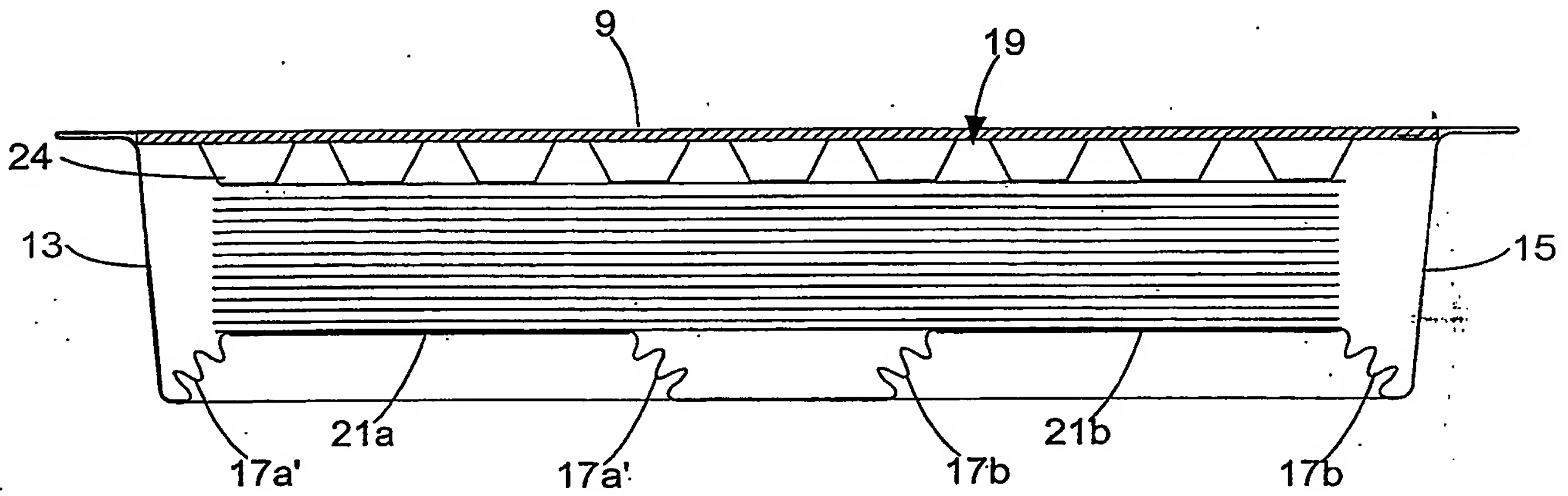


Fig. 12

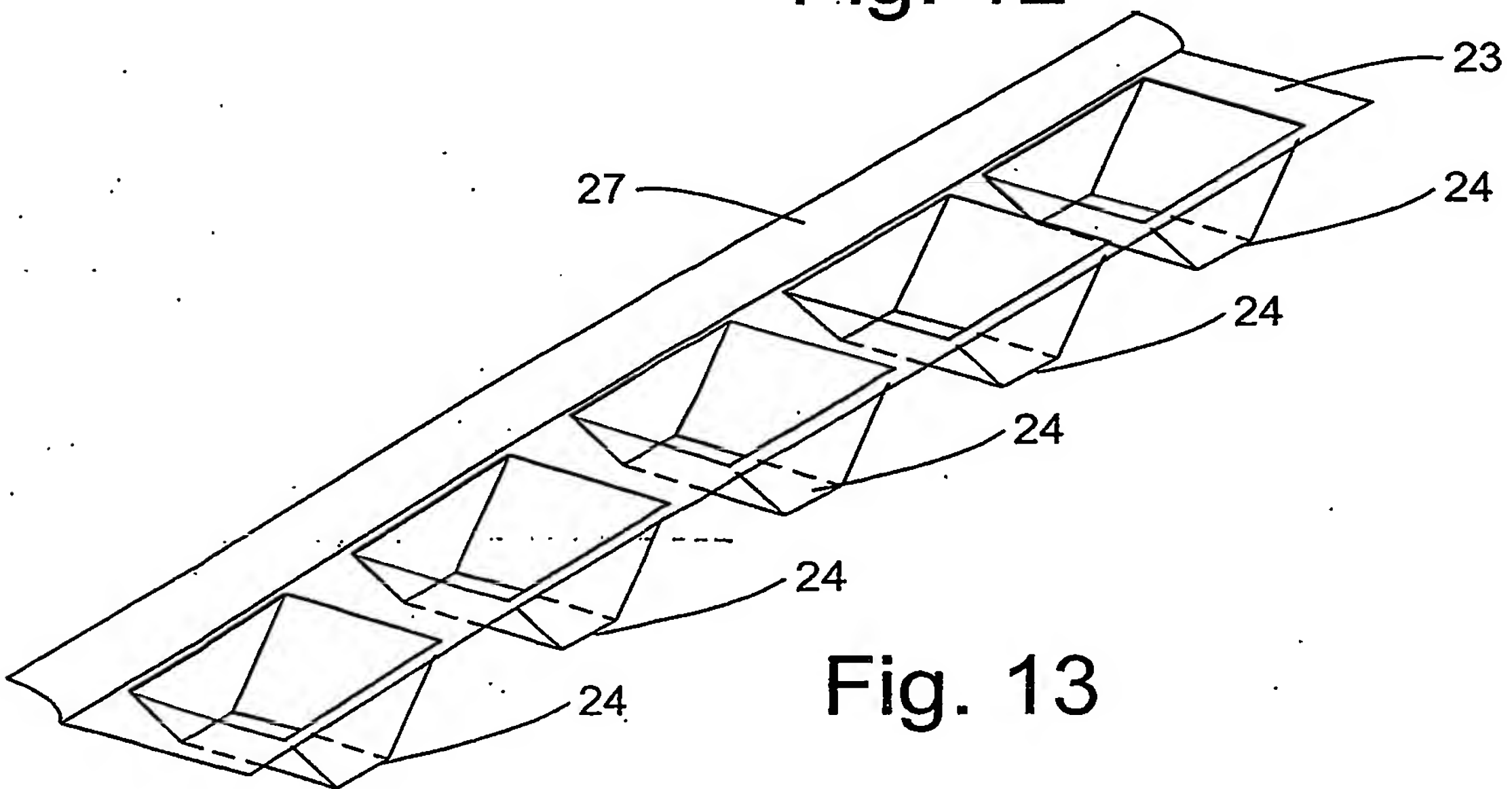


Fig. 13

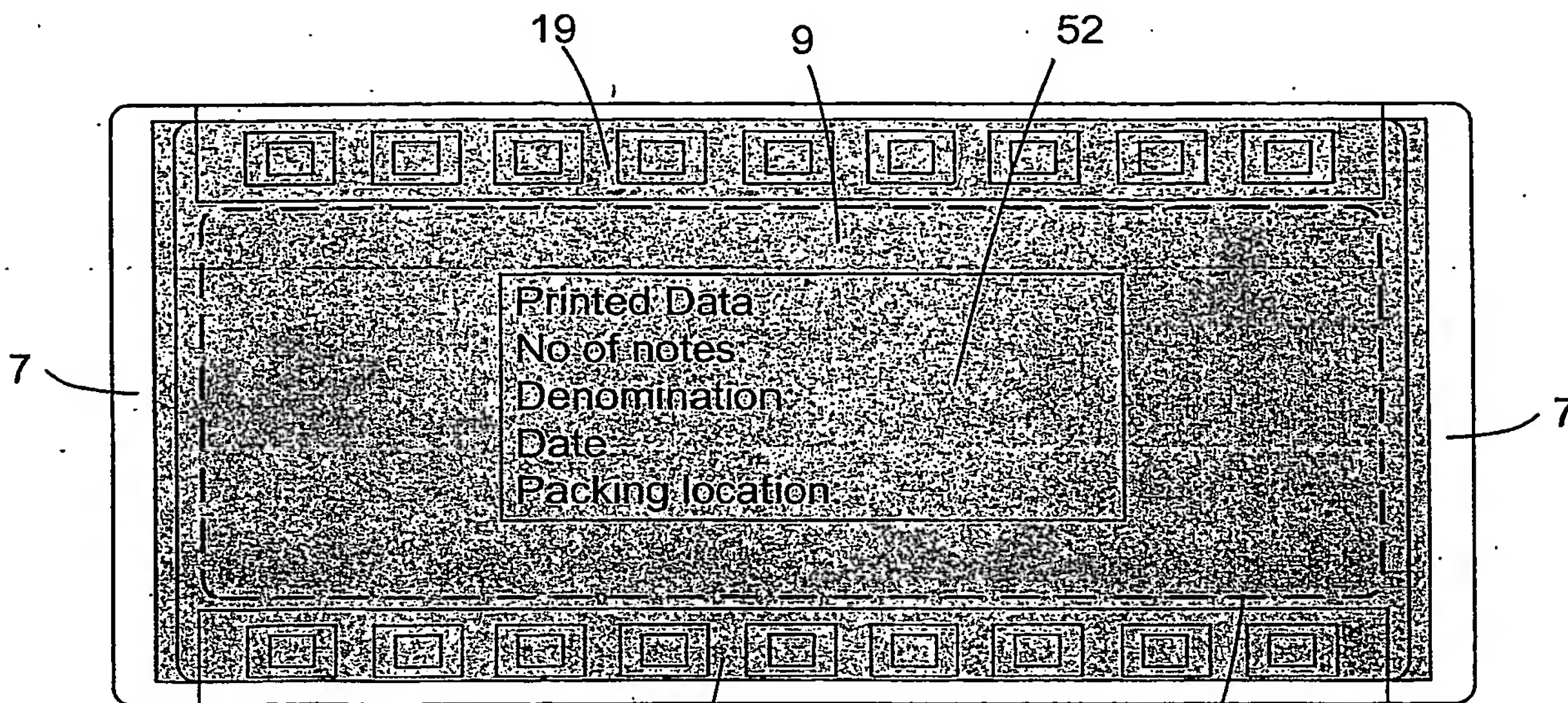


Fig. 14

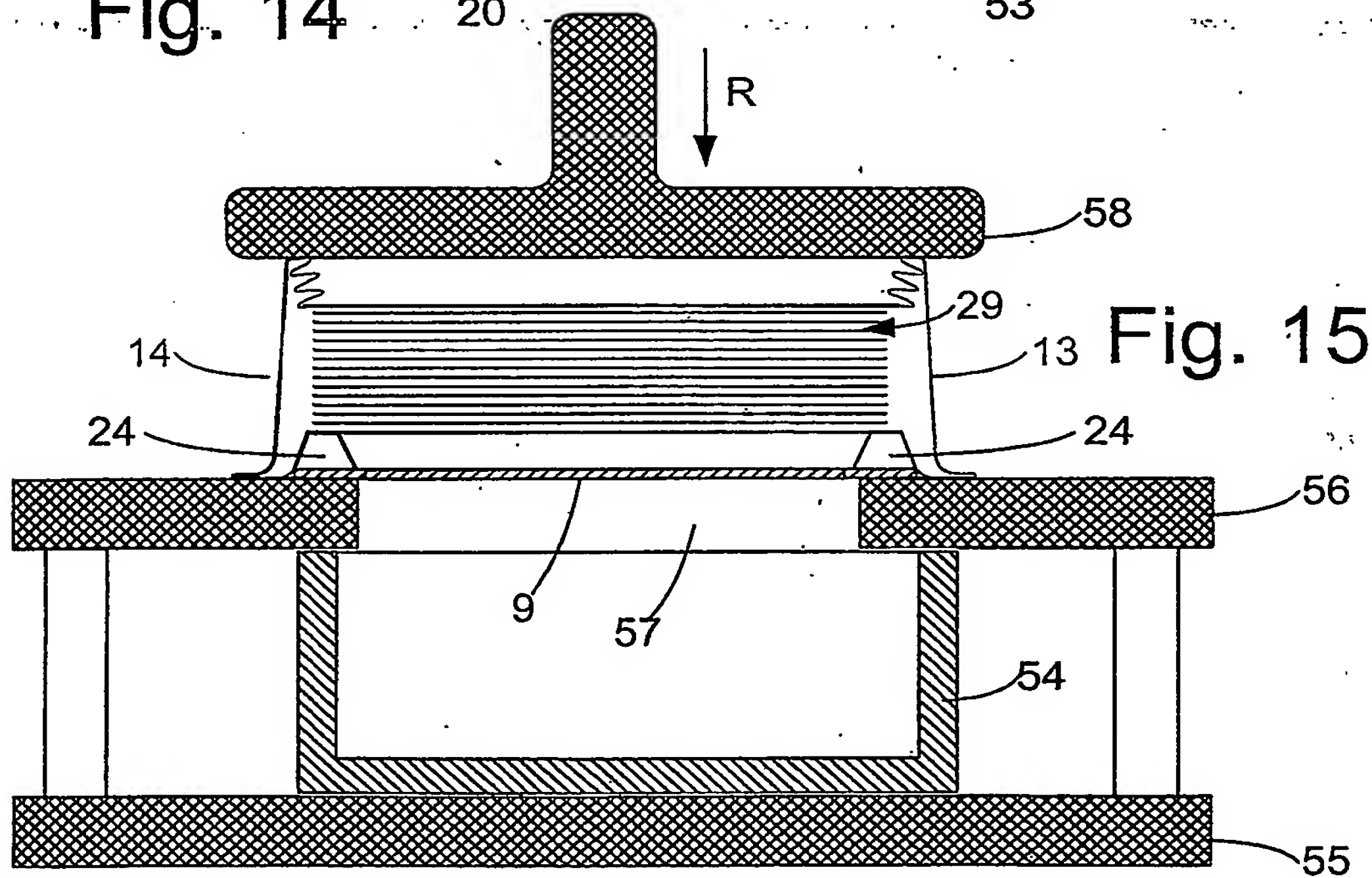


Fig. 15

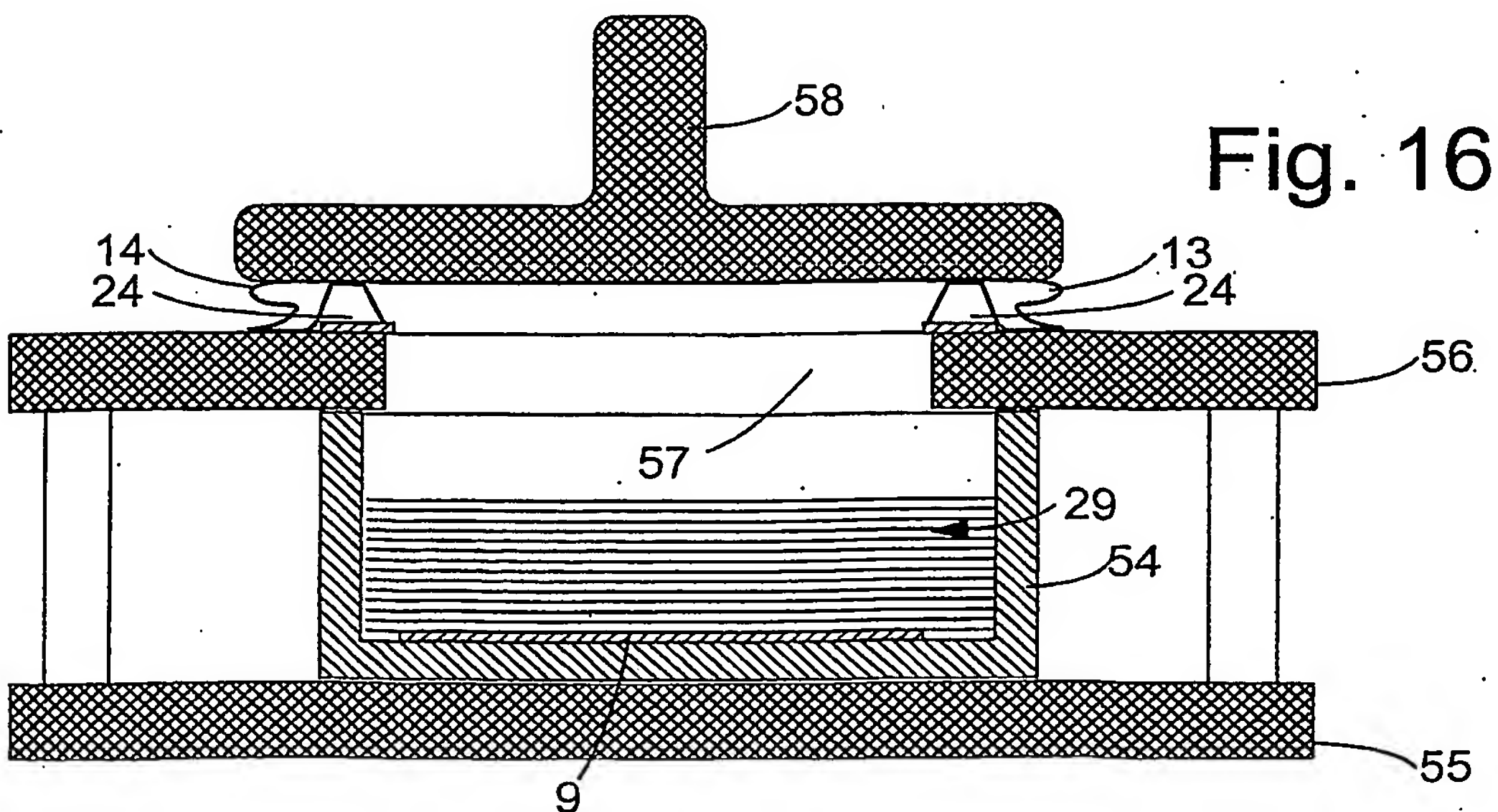


Fig. 16

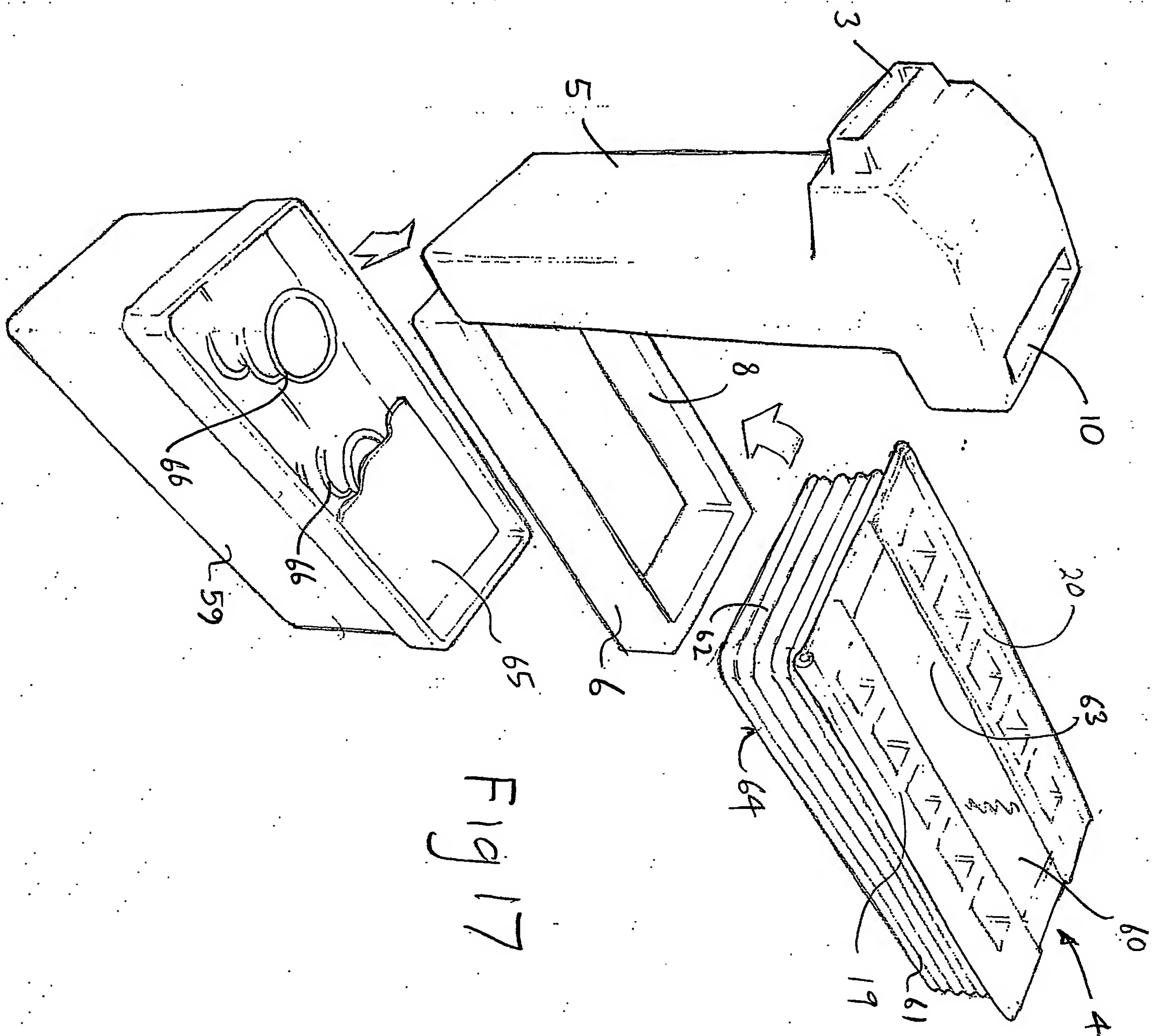


Fig 17

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